UL'IANOV, N.A., kand.tekhn.nauk

Byaluating tractive properties of wheel drives in earthmoving machines.
Stroi.i dor.mashinostr. 5 no.3:16-20 Mr '60. (MIRA 13;6)

(Traction engines)

(Tarthmoving machinery)

MIKHAYLOV, B.I., innh.; UL'YANOV, N.A., kand.tekhn.nauk

Automatic adjustment of motor grader operations. Stroi.i dor.
mashinostr. 5 no.7:6-7 Jl '60. (MIRA 13:7)

(Automatic control)
(Graders (Earthmoving machinery))

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001857920015-3"

ULIYANOV, N. A., dotsent, kand. tekhn. nauk

Choice of parameters and operating conditions of a wheelmounted motor of continuous earthmovers with cutting blades. Sbor. trud. MISI no.39:268-274 [6]. (MIRA 16:4)

(Earthmoving machinery)

UL'YANOV, Nikolay Aleksandrovich, kand. tekhn. nauk; BAZANOV, A.F., kand. tekhn. nauk, retsenzent; KONONENKO, M.A., inzh., red SAVEL'YEV, Ye.Ya., red.izd-va; SMIRNOVA, G.V., tekhn.red.

[Fundamentals of the theory and design of wheeled tractors for excavating machinery] Osnovy teorii i rascheta kolesnogo dvizhitelia zemleroinykh mashin. Moskva, Mashgiz, 1962.

206 p. (MIPA 16:4)

(Tractors-Design and construction)
(Excavating machinery)

Method of making traction computations for rollers on pneumatic tires. Stroi. i dor. mash. 7 no.8:15-16 Ag '62.

(Rollers (Earthwork))

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001857920015-3"

District and an artistic and ar

ALEKSEYEVA, T.V., kand. tekhn. nauk; ARTEM'YEV, K.A., kand. tekhn. nauk; BROMBERG, A.A., prof.; VOYTSEKHOVSKIY, R.I., inzh.; UL'YANOV, N.A., kand. tekhn. nauk; Prinimal uchastiye KONONENKO, M.A., inzh.; FEDOROV, D.I., kand. tekhn. nauk, retsenzent.

[Machines for earthwork; theory and calculation] Mashiny dlia zemlianykh rabot; teoriia i raschet. [By] T.V. Alekseeva i dr. Izd.2., perer. i dop. Moskva, Izd-vo "Mashinostroenie," 1964. 467 p. (MIRA 17:5)

UL'YANOV, N.G.

Testing an experimental hydraulic clutch in a ZIS-150 car. Sborn.trud.
lab.prob.bystr.mash. 3:205-213 '53. (MIRA 9:9)
(Automobile--Transmission devices)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001857920015-3"

# VASIL'YEVA, N.N.; UL'YANOV, N.K.

Geobotanical studies as a method of prospecting for ore deposits in central Kazakhstan. Inform.sbor.VSEGEI no.50:83-94 '61. (MIRA 15:3) (Kazakhstan--Prospecting) (Kazakhstan--Phytogeography)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001857920015-3"

#### TSYKUNKOVA, N.A.; UL'YANOV, N.K.

Occurrences of metals in eluvial and talus formations of some ore deposits in central Kazakhstan. Inform.sbor.VSEGEI no.50:71-81 (MIRA 15:8)

(Kazakhstan-Metals, Rare and minor) (Kazakhstan-Nonferrous metals)

MAROCHKIN, N.I., glav. red.; MARKOVSKIY, A.P., zam. glav. red.;

UL'YANOV, N.K., zam. glav. red.; GAHESHIN, G.S., red.;

ZAYTSEV, I.K., red.; KNIPOVICH, Yu.N., red.; KULIKOV, M.V., red.;

LABAZIN, G.S., red.; LUR'YE, M.L., red.; SIMONENKO, T.N., red.;

SPIZHARSKIY, T.N., red.; STERLIN, D.Ya., red.; TATARINOV, P.M., red.;

BELYAKOVA, Ye.Ye., nauchnyy red.; MAKRUSHIN, V.A., tekhn. red.

[Yearbook of the results of studies by the All-Union Geological Institut] Ezhegodnik po rezul'tatam rabot VSECEI. Leningrad, Otdel nauchn.-tekhn. informatsii, 1961. 203 p. (Leningrad. Vsesoiyznyi geologicheskii institut. Informatsionnyi sbornik, (MIRA 15:6) no.49.)

ULIYANOV, N.N., inzh.; SHPORKHUN, V.I., inzh.

Distributing device for the refluxing of packed columns. Khim.

mashinostr. no.3:3-4 My-Je 163.

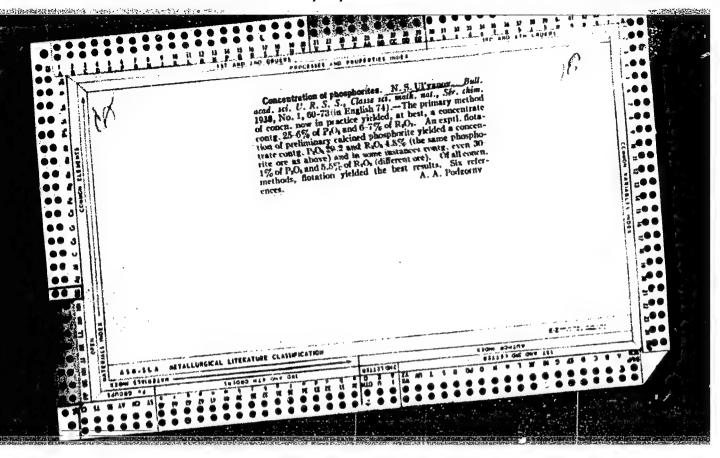
(MIRA 16:11)

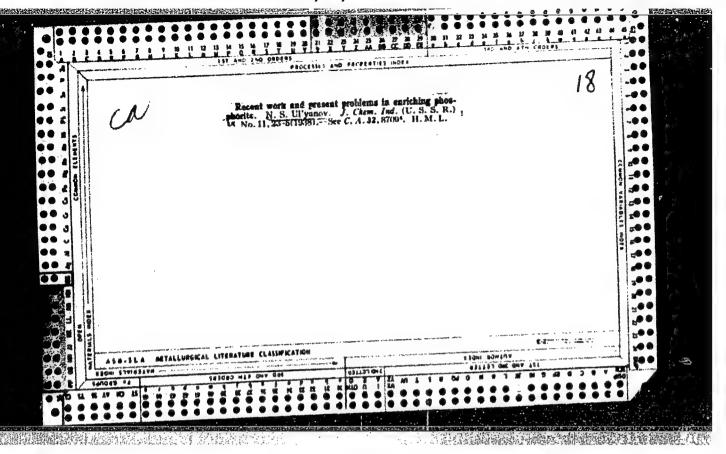
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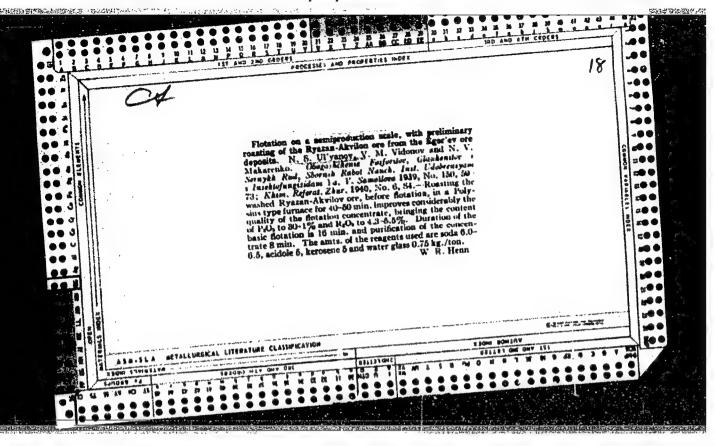
ARUTYUNYAN, B.Sh.; BORISOV, V.M.; ZHEPLINSKIY, B.M.; MESROPYAN, N.N.; MESHCHERYAKOV, N.F.; ULYANOV, N.S.

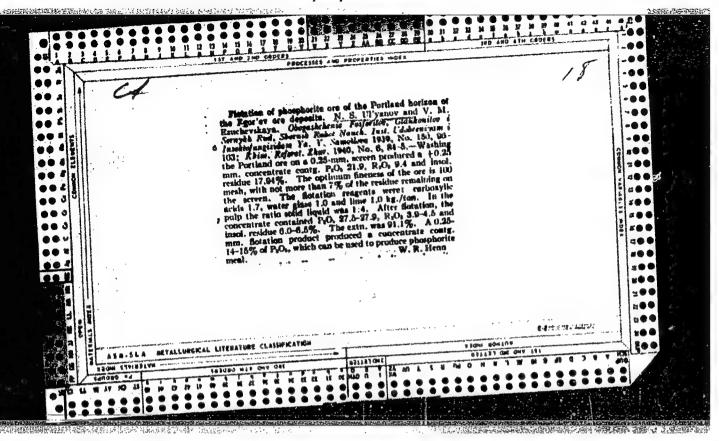
Apparatus for the destruction of flotation froth. Khim. prom. no.2:146-147 F 163. (MIRA 16:7)

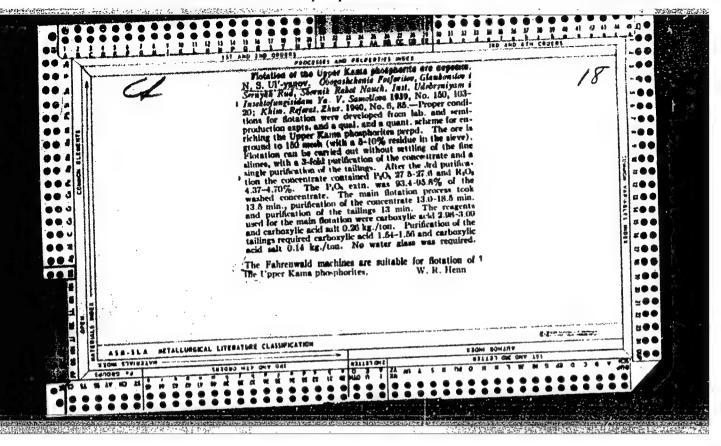
(Flotation)

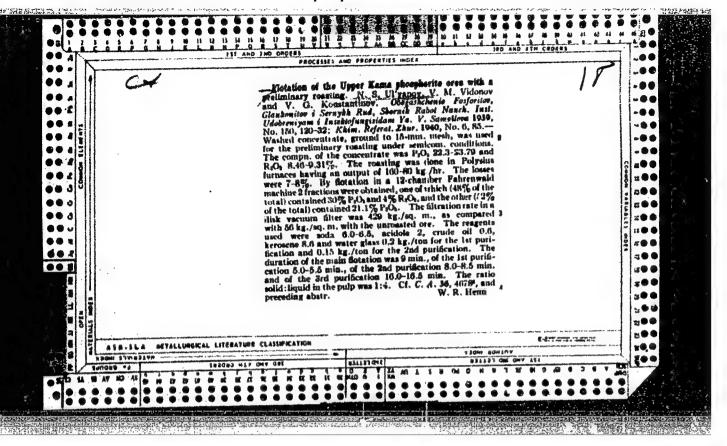


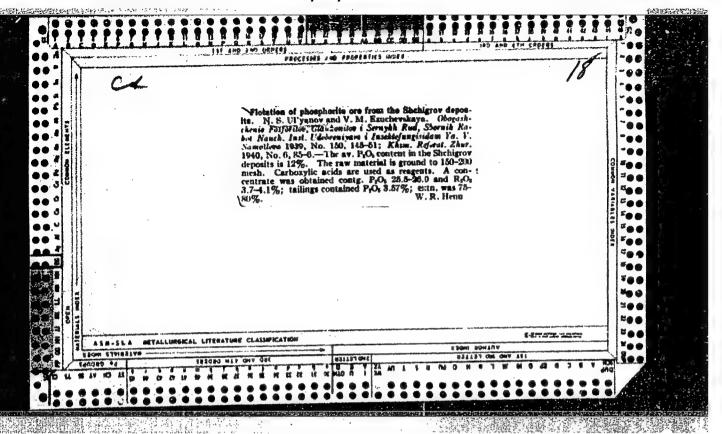






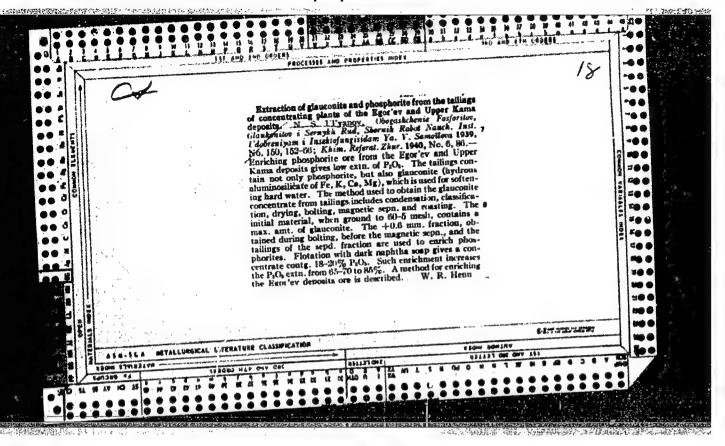






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#### CIA-RDP86-00513R001857920015-3



CIA-RDP86-00513R001857920015-3

UL'YANOV, N.S.

"Extraction of Glauconite and Phosphorite from the Tailings of Concentrating plants of the Egor'yev and Upper Kama Depostis,"

N.S. Ul'yanov, Obogashcheniye Fosforitov, Glaukonitov i Sernykh Rud, Sbornik Rabot Nauch Inst Ubobreniyam i Insektofungisidam im Ya. V. Samoylov, 1939, No 150, pp 152-66; Khim Referat Zhur 1940, No 6, pp 86 (SEE: Inst. Insect/Fungi. in Ya. V. Samoylov)

SO: U-237/49, 8 April 1949

UL'YANOV, N. S.

"Flotation of Phosphorite Ore of the Portland Horizon of the Egor'yev Ore Deposits," -N. S. Ul'yanov, and V. M. Ezuchevskaya, (Above Periodical) pp 96-103, Khim Referat Khur 1940, No 6, pp 84-5 (SEE: Inst. Insect/Fungi. in Ya. V. Samoylov)

SO: U-237/49, 8 April 1949

UL'YANOV, N. S.

"Flotation of the Upper Kama Phosphorite Ore Deposits," N. S. Ul'yanov, Above Periodical pp 103-20; Khim Meferat Zhur, 1940, No 6, 85 pp (SEE: Inst. Insect/Fungi. in Ya. V. Samoylov)

SO: U-237/49, d April 1949

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001857920015-3"

于对自由的连续数据,可以由于重要的重要的重要的。如

UL'YANCV, N. S .-

"Flotation of the Upper Nama Phosphorite Ores with a Preliminary Roasting," N. S. Ul'yanov, V. M. Vidonov, and V. G. Konstantimov, (Above Periodical) pp 120-132; Khim Referat Znur 1940, No 6, pp 65 (SEE: Inst. Insect/Fungi. in Ya. V. Samoylov)

SO: U-237/49, d April 1949

"Flotation of Phosphorite Ore from the Shchigrov Deposits,"
N. S. UL'yanov, and V. M. Ezuchevskaya, (Above Periodical) pp 145-51,
Khim Meferat Zhur 1940, No, 6, pp 85-6 (SEE: Inst. Insect/
Fungi. in Ya. V. Samoylov)

So: U-237/49, 8 April 1949

UL'YANOV, N. S.

"Flotation on a Semiproduction Scale, with Preliminary Roasting of the Ryazan-Akvilon Ore from the Egor'yev Ore Seposits," N. S. Ul'yanov, V. M. Vidonov, and N. V. Makarenko, (Above Periodical) pp 59-73, Khim Referat Zhur 1940, No 6 pp 84 (SEE: Inst. Insect/Fungi. in Ya. V.

SO: U-237/49, 8 April 1949

#### "APPROVED FOR RELEASE: 03/14/2001

CIA-RDP86-00513R001857920015-3

USSR/Chemistry Fertilizers

FD-3000

Card 1/1

Pub. 50-1/17

Author

: Ul'yanov, N. S. \*

Title

The most immediate tasks of the mined chemical raw materials

industry

Periodical

: Khim. prom. No 6, 321-324, Sep 1955

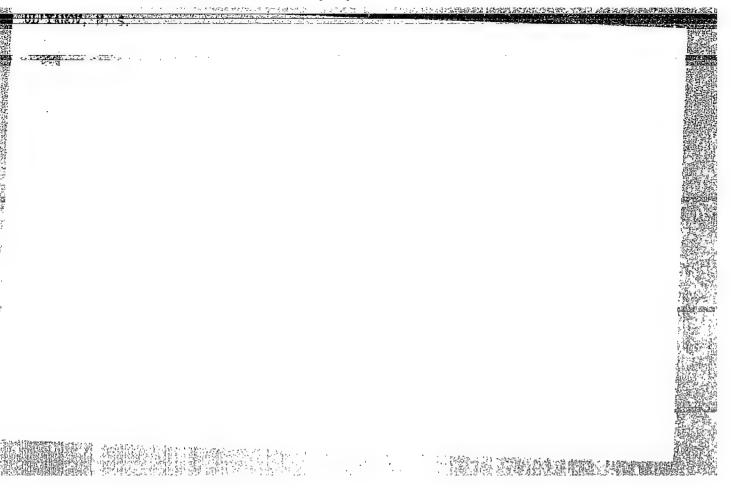
Abstract

: Discusses the mining of phosphate and potassium minerals, suggesting improvements. On the basis of USA and German experience, recommends enrichment of potassium salts by flotation and expresses the opinion that the use of a hydrocyclone in combination with flotation methods is advisable. States that the gravitational method for the enrichment of Chulak-Tau and Ak-Say phosphorites is still in need of improvement, while enrichment of phosphorites by flotation has yielded good results. Says that research on the replacement of the autoclave method of melting out sulfur has lagged and should be expedited.

Institution

Main Administration of the Mined Chemical Raw Materials Industry

(\*Chief)



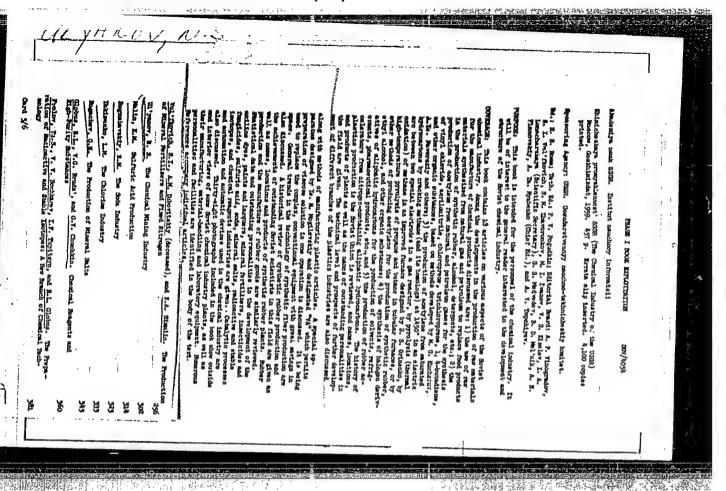
Phospi no.7:	430-432 U=N 157.	potassium fertilizers. Potassium salts)	Khim.prom. (MIRA 10:12)
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UL'IANOV, N.S.

Conference on problems of the development of the potash industry.

Khim, prom. no.1:54-55 Ja-7 '58. (MIRA 11:3)

(Potash industry-Congresses)



UL'YANOV, Nikolay Yegorovich; LISTOV, I.V., red.; MEL'NIKOV, V.I., tekhn. red.

[Outstanding people of Luzino] Znatnye liudi Luzino. Omsk, Omskoe knizhnoe izdatel'stvo, 1960. 70 p. (MIRA 14:12) (Ul'yanovskii District (Omsk Province)—Agricultural workers)

LEKAYE, V.M.; YELKIN, L.N.; UL'YANOV, N.S., kand. tekhn. nauk, red.

[Modern methods of sulfur recovery from sulfur ores]
Sovrembye sposoby polucheniia sery iz sernykh rud;
uchembe posobie, Moskva, Mosk. khimiko-tekhnolog. in-t im.
D.I.Mendeleyeva, 1961. 75 p. (MIRA 16:10)

(Sulfur)

UL'YANOV, N.S.

Problems in the development of mining, ore dressing, and chemical processing industries. Gor. shur, no.5:3-5 \* '63. (MIRA 16:5)

1. Gosudarstvennyy komitet po khimii pri Gosplane SSSR. (Apatite) (Phosphates) (Potassium) (Sulfur)

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1 1963, 225-233

"APPROVED FOR RELEASE: 03/14/2001	CIA-RDP86-00513R001857920015-3	
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UL'YANOV, O.1.

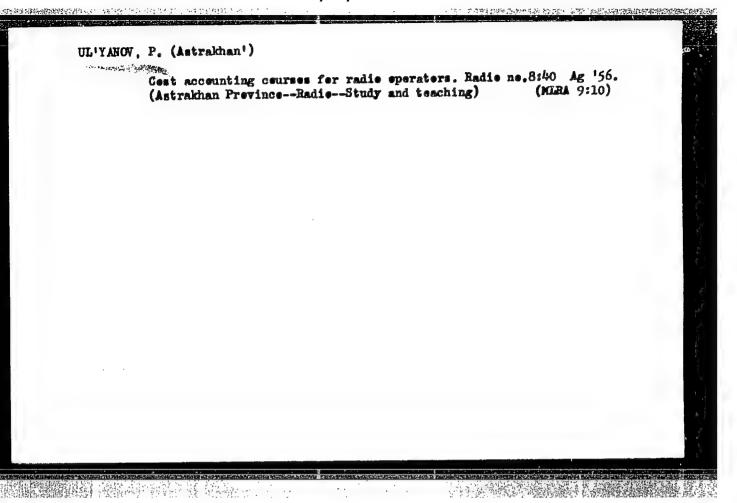
Designing a ferrodynamic galvanometer. Izv.vys.ucheb.zav.; prib. 7 no.2146-52 164. (MIRA 18:4)

1. Kuybyshevskiy politekhnicheskiy institut imeni Kuybysheva. Rekomendovana kafedroy izmeritelincy tekhniki.

UL'YANOV, P., polkovnik.

The eastern Pomeranian operation. Voen.snan. 29 no.9:10-11 S '53.
(MLRA 6:12)

(World War, 1939-1945---Campaigns)



ABRAMOV, A.A., redaktor; BOLTYANSKIY, V.G., redaktor; VASIL'YEV, A.M., redaktor; MEDVEDEV, B.V., redaktor; MYSHKIS, A.D., redaktor; HIKOL'SKIY, S.M., otvetstvennyy redaktor; POSTNIKOV, A.G., redaktor; PROXHOROV, Yu.V., redaktor; RYBNIKOV, K.A., redaktor; UL'YAHOV, P.L., redaktor; USPENSKIY, V.A., redaktor; CHETAYEV, N.G., redaktor; SHILOV, G.Ye., redaktor; SHIRSHOV, A.I., redaktor; SIMKIMA, Ye.N., tekhnicheskikh redaktor

[Proceedings of the third All-Union mathematical congress] Trudy tret'ego vsesoiusnogo matematicheskogo s\*ezda. Moskva, Izd-vo Akademii nauk SSSR. Vol.1. [Reports of the sections] Sektsionnye doklady. 1956. 236 p. (MLRA 9:7)

1. Vsesoyuznyy matematicheskiy s\*yezd.3rd Moscow, 1956. (Mathematics)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001857920015-3"

BEREZOVIKO, P.; KOZHEVNIKOV, N., inzh.-tekhnolog; M.L'NIKOV, A.;

UL'YANOV, P., konditer

Advice to the cook. Obshchestv.pit. no.11:16-17 N '59.

(HIRA 13:3)

1. Upravleniye rabochego snabzheniya Sverdlovskogo sovnarkhoza

(for Kozhevnikov).

(Cookery)

#### ULIYAHOV, P.

Party organization of the interfarm building organizations. Sel'.stroi. 15 no.8:12-14 Ag '60. (MIRA 13:8)

1. Sekretar' partorganizatsii Gul'kevichskogo meshkolkhosstroya Krasnodarskogo kraya.

(Krasnodar Territory-Building) (Collective farms-Interfarm cooperation)

ULIYANOV, P., kand.economicheskikh nauk

Socialist economy is the indestructible basis for our country's defenses.

Tyl i snab.Sov.Voor.Sil 21 no.2:10-15 F '61. (MIRA 14:6)

(Russia—Economic conditions)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001857920015-3"

UL'YANOV, P., kand.ekonomicheskikh nauk

Communism is an abundance. Komm.Vooruzh.Sil 2 no.3:39-47 F '62.

(MIRA 15:1)

(Cost and standard of living)

UNYANUTO 1.1.

AID Nr 971-17 20 May

VACUUM CLADDING OF REFRACTORY METALS (USSR)

Ul'yanov, P. A., N. D. Tarasov, and S. F. Koftun. Tsvetnyye metally, no. 3, Mar 1963, 74-76. S/136/63/000/003/004

The cladding of Nb, Mo, and Ta with 1X18H9T [AISI-321] stainless steel, Nichrome, 3N-602 alloy [3% Fe, 0.35-0.75% Al and Ti, 0.4% Mn, 19-22% Cr, 1.8-2.3% Mo, 0.8% Si, 0.08% C, 1.3-1.8% Nb], and zirconium has been investigated experimentally. Cladding was performed in a vacuum rolling mill designed by the Physicotechnical Institute of the Ukrainian Academy of Sciences. Refractory billets were mechanically cleaned or pickled, spot welded or riveted to the cladding material, heated in vacuum to the rolling temperature, and then rolled to the required thickness. Pressure in the vacuum system during heating and rolling was maintained at 4.10-5 mm Hg or lower. In order to prevent work hardening, the rolling temperature was maintained above that of the recrystallization of the rolled metal. The strength of the

Card 1/2

 AID Nr. 971-17 20 May

VACUUM CLADDING [Cont'd]

8/136/63/000/003/003/004

bond between the cladding and the base metal was found to increase with increasing reduction and with higher rolling temperatures. Microhardness tests showed that Mo and Cr-Ni alloy claddings do not form chemical compounds in the interface zone, A sharp increase of interface microhardness from - 230 to 740 kg/mm² was observed in Nb clad with 2N-602 alloy. Some hardness increase was observed in Nb clad with Zr or Ti. Aging at 1200°C for 2 hrs had little or no effect on the structure or strength of the bond between Mo or Nb and Cr-Ni alloy cladding; aging at 1200°C for 10 hrs increased bond strength by 15-20%. Shear strength of the bond between niobium and zirconium cladding rolled at 1100°C with reductions of 20 or 40% was - 30 or 64 kg/mm², respectively, and that between molybdenum and 2N-602 cladding rolled at 1190°C with reductions of 20 or 45% was - 28 or 43 kg/mm², respectively. [AZ]

Card 2/2

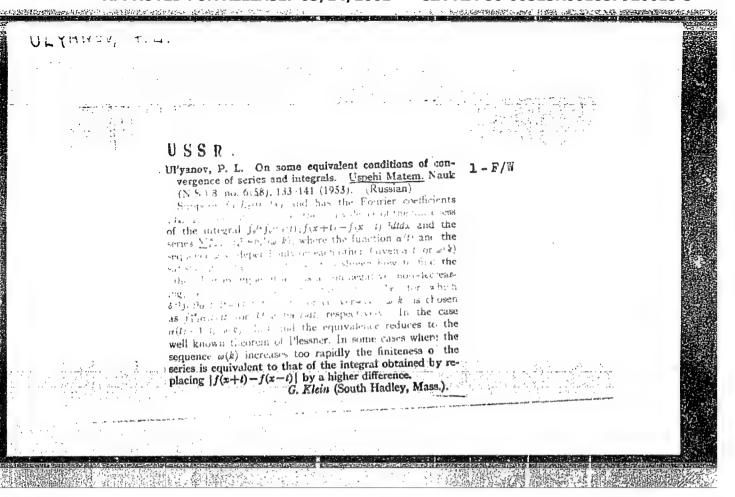
UL'YANOV, P.L.

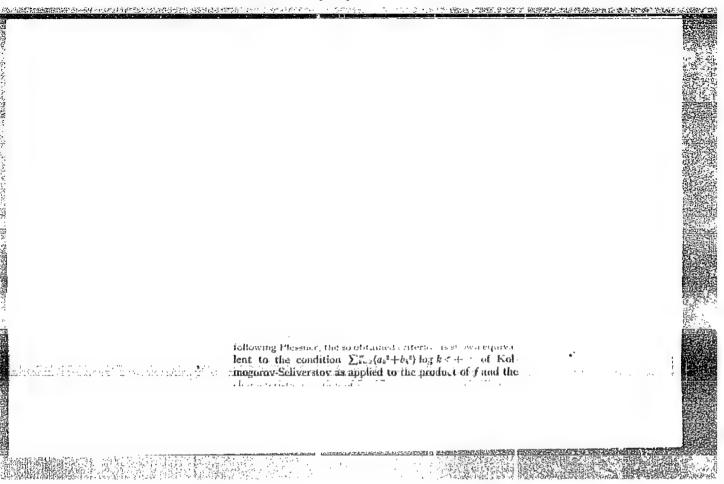
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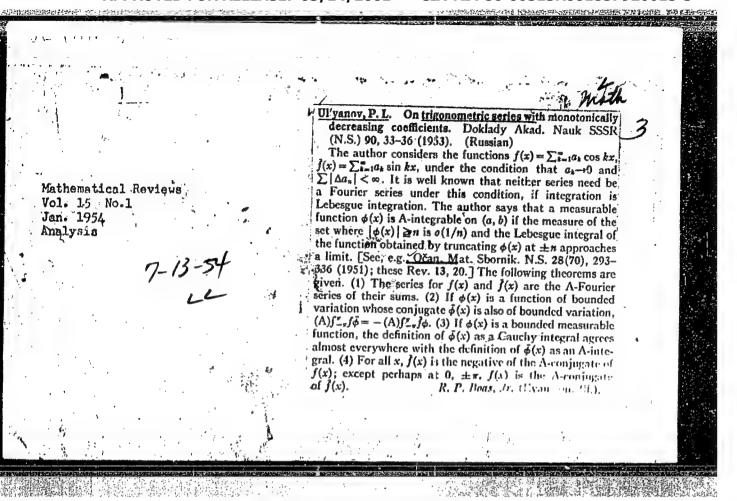
Series in Haar's system. Vest. Mosk. un. Ser. 1: Mat., mekh. 20 no.4135-43 Jl-Ag 165. (MIRA 18:9)

l. Kafedra teorii funktsii i funktsional'nogo analiza Moskovskogo gosudarstvennogo universiteta imeni M.V. Lomonosova.

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001857920015-3"







USSR/Mathematics - Fourier series

FD-1427

Card 1/1

: Pub. 64 - 5/9

Author

: Ul'yanov, P. L. (Moscow)

Title

: Application of A-integration to a class of trigonometric series

Periodical

: Mat. sbor., 35 (77), pp 469-490, Nov-Dec 1954

.Abstract

The main results of this work were formulated without proof in the author's article "Trigonometric series with monotonically drcreasing coefficients." DAN SSSR, 90, No 1, 33-36, 1953. In the present work the author gives the principal definitions and cites certain works devoted to the same problem. He proves that  $f(x) = a_0 + \Sigma$   $a_{k-1} = a_{k-1} = a_$ 

Institution

Submitted: October 28, 1953

 Ulyanov, P. L. Some questions of A-integration. Dokl. 1 = F/RAkad. Nauk SSSR (N.S.) 102 (1955), 1977-1080.

(Russian)

A measurable real-valued function f on [a, b] is said to be A-integrable if

(1)  $m[x:x \in [a, b], |f(x)| < n] = o(n^{-1})$ and

(2)  $\lim_{x \to \infty} \int_{-\infty}^{\infty} \min[\max(f(x), -n), n] dx = (A) \int_{-\infty}^{\infty} f(x) dx$ exists and is finite. This notion is attributed to Kolmogorov, and differs hardly at all from the Q-integral of Titchmarts [Proc. London Math. Soc. (2) 29 (1928), 49-80]. [For other applications of this notion, see Ulyanov same Dokl. (N.S.) 90 (1953), 33-36; Mat. Sb. N.S. 35(77) (1954), 469-490; MR 15, 27; 16, 467.] The author states that Kolmogorov proved property (1) for all functions on  $[0, 2\pi]$  conjugate to functions in  $L_1(0, 2\pi)$  [Fund. Math. 7 (1923), 24-29), but Kolmogorov seems only to have proved that the left side is  $o(n^{-1})$ . For  $f \in L_1(0, 2\pi)$ , let f denote the conjugate function of f. Theorem:  $L|f \in L_1(0, 2\pi)$  and if g and g are essentially bounded, then

	Olymon, P.L.		~~	
	$(A) \int_{0}^{2\pi} [f(x+t)-f(t)]^{2\pi}$	$x)dx = -\int_0^{2\pi} f(x)g(x)dx,$ $(p>1) \text{ and } f \text{ has period } 2\pi,$ $(x-t) \text{ if } \frac{1}{2}t dt = -\pi f(x)$	then 2/	
	for almost all $x \in [0, 2\pi]$ , inverting the transform / sketched.	A formula is also given $\rightarrow I$ ( $I \in L_1(-\pi, \pi)$ ). Proofs $E$ , Hewitt (Ptin eton, N.J.	for 2	
			* K	

ULY ANOV, P.L.

USSR/MATHEMATICS/Theory of functions

CARD 1/2

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SUBJECT

PERIODICAL

ULJANOV P.L.

TITLE On the conti

On the continuation of functions.

Doklady Akad. Nauk 105, 913-915 (1955) reviewed 7/1956

The author considers a function f(x) which is defined on  $[\alpha, \beta]$  and or  $[a,b] \subseteq [\alpha,\beta]$  has the property A. He seeks a function  $f_1(x)$  which is defined on [c,d] (where  $(c,d)\supset [a,b]$ ), on [a,b] identical with f(x) and on [c,d] possesses the property A. Beside of f(x) its conjugate function

 $\overline{f}(x) = -\lim_{\varepsilon \to 0} \frac{1}{\pi} \int_{-2 \text{ tg } \frac{1}{2} \text{ t}}^{\pi} dt$ 

is considered.  $\xi$ For integrable and continuous functions the following theorems are formulated and a sketchy proof is given: 1. Let the periodic function  $f(x) \in L(0,2\pi)$  have the property that f(x) and  $\overline{f}(x)$  are integrable on  $[a,b] \subseteq [0,2\pi]$  and for a  $\xi > 0$  holds:

 $\int_{0}^{n} f(b+t) dt = 0 \left\{ \left( \ln \frac{1}{|n|} \right)^{-1-\xi} \right\} , \int_{0}^{n} f(a+t) dt = 0 \left\{ \left( \ln \frac{1}{|n|} \right)^{-1-\xi} \right\} .$ 

Then there exists a function  $\varphi(x)$  such that  $\varphi(x) = f(x)$  on [a,b] and  $\varphi(x) \in L(0,2\pi)$ ,  $\varphi(x) \in L(0,2\pi)$ . ?. Let  $f(x) \in L(0,2\pi)$  be periodic, f(x) and

Doklady Akad. Nauk 105, 913-915 (1955)

OARD 2/2

PG - 182

 $\overline{f}(x)$  continuous on  $[a,b] \subset [0,2\pi]$ . Then f(x) can be continued from [a,b] to  $[0,2\pi]$  such that it and its conjugate function are continuous on the whole interval  $[0,2\pi]$ . 3. Let  $f(x) \in L(0,2\pi)$  be periodic, f(x) and  $\overline{f}(x)$  essentially bounded on  $[a,b] \subset [0,2\pi]$  and

$$\int_{0}^{t} f(a+n) dn = O(|t|), \qquad \int_{0}^{t} f(b+n) dn = O(|t|)$$

$$\frac{1\text{im}}{h \to 0} \left| \int_{h}^{\pi} \frac{f(a+n)-f(a-n)}{n} dn \right| < \infty , \quad \frac{1\text{im}}{h \to 0} \left| \int_{h}^{\pi} \frac{f(b+n)-f(b-n)}{n} dn \right| < \infty .$$

then f(x) can be continued from [a,b] to  $[0,2\pi]$  such that the property of the essential boundedness for f and f remains true.

INSTITUTION: Lomonossov University, Moscow

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ABRAMOV, A.A., redaktor; BOLTYANSKIY, V.G., redaktor; VASIL'YEV, A.M., redaktor; MEDVEDEV, B.V., redaktor; MYSHKIS, A.D., redaktor; NIKOL'SKIY, S.M., otvetstvenny; redaktor; POSTHIKOV, A.G., redaktor; PROKHOROV, Yu.V., redaktor; RYHNIKOV, K.A., redaktor; UL'YANOV, P.L., redaktor; USPENSKIY, V.A., redaktor; GHETAYEV, N.G., redaktor; SHILOV, G.Ye., redaktor; SHIRSHOV, A.I., redaktor; SIMKINA, Ye.H., tekhnicheskiy redaktor

[Proceedings of the all-Union Mathematical Congress] Trudy tret'ego vsesoiuznogo Matematicheskogo s\*ezda; Moskva iiun'-iiul' 1956.

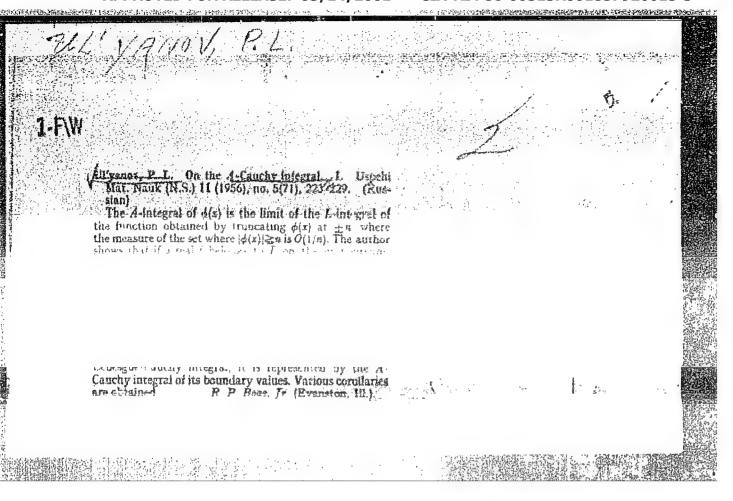
Moskva, Izd-vo \*kademii nauk SSSR. Vol.2. [Brief summaries of reports] Kratkoe soderzhanie obzornykh i sektsionnykh dokladov.

1956. 166 p. (MLRA 9:9)

 Vsesoyuznyy matematicheskiy s\*yezd. 3, Moscow, 1956. (Mathematics)

## "APPROVED FOR RELEASE: 03/14/2001

#### CIA-RDP86-00513R001857920015-3



Subject

USSR/MATHEMATICS/Fourier series

CARD 1/2

PG - 742

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AUTHOR TITLE

ULJANOV P.L.

On almost everywhere permanently convergent series.

PERIODICAL

Mat.Sbornik, n. Ser. 40, 1, 95-100 (1956)

reviewed 5/1957

An almost everywhere permanently convergent function series is a series which converges almost everywhere for an arbitrary transposition of the terms.

Let  $\{P_n(x)\}$  (n=0,1,2,...) be a system of polynémials, being defined on [a,b], being complete with respect to L and closed with respect to L<sup>2</sup>, which is orthonormalized with the weight  $\mathcal{T}(x)$  ( $\mathcal{T}(x)$  is defined on [a,b], positive and integrable). The series

(1)

$$\sum_{k=0}^{\infty} c_k P_k(x)$$

is called the Fourier series of the integrable function f(x) if

$$c_k = \int_{R}^{b} f(x) T(x) P_k(x) dx$$
 (k=0,1,2,...).

Let  $\omega$  (  $\delta$ ,f) be the modulus of continuity of f on [a,b] with the length of

Mat.Sbornik, n. Ser. 40, 95-100 (1956)

CARD 2/2

PG - 742

steps &. Joining the results of Kolmogorov (Doklady Akad. Nauk 1, 291-294 (1934)) and Natanson (Doklady Akad. Nauk 2, 209-211 (1934)) the author proves the

1. If  $f(x) \in L(a,b)$  and

$$\omega(\delta,f) = 0 \left\{ \frac{1}{\ln \frac{1}{\delta} \left( \ln \ln \frac{1}{\delta} \right)^{1+\varepsilon}} \right\} \text{ for } \delta \to +0,$$

then the Fourier series (1) of the function f(x) on [a,b] converges almost everywhere for an arbitrary arrangement of the terms. 2. If f(x) is of bounded variation on a,b and if

$$0 < C(x) \le \frac{A}{\sqrt{(b-x)(x-a)}} \quad \text{for } x \in [a,b] ,$$

then for every <>0 there holds

$$\sum_{k=0}^{\infty} \left| c_k \right|^{1+\xi} < +\infty \qquad \sum_{k=0}^{\infty} c_k^2 \, k^{1-\xi} < +\infty \, .$$

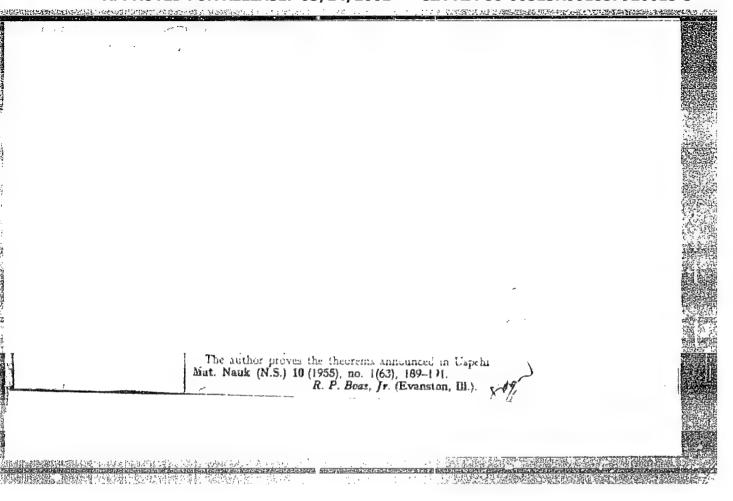
$$\sum_{k=0}^{\infty} c_k^2 k^{1-\epsilon} < +\infty$$

INSTITUTION: Moscow.

UL'YANOV, P.L.

A-integral and conjugate functions. Uch. sap. Mosk. un. mo.181:
139-157 '56. (MLRA 10:4)

(Fourier's series) (Integrals)



Transactions of the Third All-union Mathematical Congress (Cont.) Moscow  Jun-Jul 156 Trudy 156, V. la Sect. Rpts. Izdatel'stvo AN SSSR, Moscow, 1956, 237 pt.  Ul'yanov, P. L. (Moscow). About A-integrals of Cauchy. 107-108  Fedorov, V. S. (Ivanovo). On Monogenic Functions. 108-109  Fishman, K. M. (Chernovitsy). On a Class of Hilbert  Spaces of Analytic Function. 109  Fuksman, N. A. (Tashkent). About Analytic Functions of Integral Complex Argument. 109-110  Mention is made of Romanov, N. P.  Khavinson, S. Ya. (Moscow). P. L. Chebyshev's Systems and the Uniqueness of the Best Polynomial Approximation in the Metrics of L. Space. 110	UL	YAHOV, P. L.	
Ul'yanov, P. L. (Moscow). About A-integrals of Cauchy.  Fedorov, V. S. (Ivanovo). On Monogenic Functions.  Fishman, K. M. (Chernovitsy). On a Class of Hilbert Spaces of Analytic Function.  Fuksman, N. A. (Tashkent). About Analytic Functions of Integral Complex Argument.  Mention is made of Romanov, N. P.  Khavinson, S. Ya. (Moscow). P. L. Chebyshev's Systems and the Uniqueness of the Best Polynomial Approximation in the Metrics of L, Space.	r	Transactions of the Third All-union Mathematical Congress	(Cont.) Moscow,
Fedorov, V. S. (Ivanovo). On Monogenic Functions.  Fishman, K. M. (Chernovitsy). On a Class of Hilbert Spaces of Analytic Function.  Fuksman, N. A. (Tashkent). About Analytic Functions of Integral Complex Argument.  Mention is made of Romanov, N. P.  Khavinson, S. Ya. (Moscow). P. L. Chebyshev's Systems and the Uniqueness of the Best Polynomial Approximation in the Metrics of L, Space.		Jun-Jul : '56 Trudy '56, V. 1, Sect. Rpts, Tratel'stvo AN SSSR, Mosco There are 6 references, all of them USSR.	w, 1956, 23/ pp.
Fedorov, V. S. (Ivanovo). On Monogenic Functions.  Fishman, K. M. (Chernovitsy). On a Class of Hilbert Spaces of Analytic Function.  Fuksman, N. A. (Tashkent). About Analytic Functions of Integral Complex Argument.  Mention is made of Romanov, N. P.  Khavinson, S. Ya. (Moscow). P. L. Chebyshev's Systems and the Uniqueness of the Best Polynomial Approximation in the Metrics of L, Space.			
Spaces of Analytic Function.  Fuksman, N. A. (Tashkent). About Analytic Functions of Integral Complex Argument.  Mention is made of Romanov, N. P.  Khavinson, S. Ya. (Moscow). P. L. Chebyshev's Systems and the Uniqueness of the Best Polynomial Approximation in the Metrics of L. Space.			108-109
Mention is made of Romanov, N. P.  Khavinson, S. Ya. (Moscow). P. L. Chebyshev's Systems and the Uniqueness of the Best Polynomial Approximation in the Metrics of L. Space.		Fishman, K. M. (Chernovitsy). On a Class of Hilbert Spaces of Analytic Function.	109
Khavinson, S. Ya. (Moscow). P. L. Chebyshev's Systems and the Uniqueness of the Best Polynomial Approximation in the Metrics of L. Space.		Fuksman, N. A. (Tashkent). About Analytic Functions of Integral Complex Argument.	109-110
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APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001857920015-3"

ULYANOV, P.L.

SUBJECT USSR/WATHEMATICS/Theory of functions

CARD 1/3 PG - 724

AUTHOR

ULJANOV P.L. On Cauchy A-integrals on curves.

TITLE PERIODICAL On Cauchy 1-1111-112, 383-385 (1957)
Doklady Akad. Nauk 112, 383-385 (1957)

reviewed 4/1957

In the complex S-plane let be given a smooth curve 1 of the length  $1_0$  beginning in  $S_0$  and ending in  $S_0$ . Its equation be  $S = T(s) = T_1(s) + i T_2(s)$ , where s is the arc length of  $S_0$  to  $S_0$  ( $S_0 = T(0)$ ,  $S_0^* = T(1_0)$ ). Then the function  $f(S) = f_1(s) + i f_2(s)$  being defined on 1 is called A-integrable on 1 if the functions

$$\Psi_1(s) = [f_1(s) T_1'(s) - f_2(s) T_2'(s)]$$

$$\varphi_2(s) = [f_2(s) C_1(s) + f_1(s) C_2(s)]$$

are A-integrable on the line  $0 \le s \le 1_0$  (as to the A-integrability on lines compare Titchmarsh, Proc.London Math.Soc. 29, 49 (1929)). The complex number

Doklady Akad. Nauk 112, 383-385 (1957)

PG - 724

$$I = (A) \int_{0}^{1} \varphi_{1}(s) ds + i(A) \int_{0}^{1} \varphi_{2}(s) ds$$

is called the A-integral of the function  $f(\zeta)$  on the curve 1

(A) 
$$\int_{\mathbf{I}} f(\zeta) d\zeta = \mathbf{I}$$
.

With the aid of this definition the following principal result can be formulated: Let 1 be a closed curve which limits the domain G. Its equation be  $\zeta = \zeta(s) = x(s)+iy(s)$ , where

$$|x'(s_2)-x'(s_1)| \le k |s_2-s_1|^{\alpha}$$
,  $|y'(s_2)-y'(s_1)| \le k |s_2-s_1|^{\alpha}$ 

for all  $s_1$ ,  $s_2$  and certain constant k > 0,  $\alpha > 0$ . If the analytic function P(z) is representable in 0 by an L-integral of the Cauchy type, i.e. if

$$P(z) = \frac{1}{2\pi i} (L) \int_{1}^{\infty} \frac{f(\zeta)}{\zeta - z} d\zeta$$
  $(z \in C, f(\zeta) \in L(1)),$ 

Doklady Akad. Nauk 112, 383-385 (1957)

CARD 3/3 PG - 724

then

$$\mathbf{F}(z) = \frac{1}{2\pi i} (\mathbf{A}) \int_{1}^{\infty} \frac{\mathbf{F}_{i}(\zeta)}{\zeta - z} d\zeta,$$

where  $F_i(\zeta)$  are the limit values of the function F(z) if z coming from the interior of G reaches 1. Some conclusions are given.

20-4-12/51 UL'YANOU, P.L. On Permutations of a Trigonometric System (O perestanovkakh UL'YANOV, P.L. AUTHOR: PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol. 116, Nr. 4, pp. 568-571 (USSR)  $\frac{a_0}{2} + \sum_{k=1}^{\infty} (a_k \cos k x + b_k \sin k x)$ Let ABSTRACT: be the Fourier series of  $f(x) \in L(0,2\pi)$ ,  $f(x+2\pi) = f(x)$ . (1) is called unconditionally convergent almost everywhere if it converges almost everywhere after an arbitrary permutation of the terms. Let  $E_n^{(2)}(f)$  be the best approximation of f(x) in the metric of the  $L^2$  by trigonometric polynomials of the order (n-1).  $\frac{(\ln \ln n)^{1+\epsilon} \ln n}{(\ln \ln n)^{1+\epsilon} \ln n} \left\{ g_n^2(t) \right\}^2 < \infty$ ,  $\epsilon > 0$ , then (1) converges unconditionally almost everywhere on [0,2%]. Theorem: If for 6>0 there holds :  $\frac{|f|}{|\ln t| |\ln |\ln t|} \frac{1+8}{t} \left[ f(x+t) - f(x-t) \right]^2 dx dt < \infty,$ Card 1/2

On Permutations of a Trigonometric System

20-4-12/51

then (1) is unconditionally convergent almost everywhere on  $[0,2\pi]$ .

Theorem: There exists a continuous  $2\pi$  -periodic function f(x)

Theorem: There exists a continuous 2 R -particular tuneston 1(1) the Fourier series of which after a certain permutation of the terms does not converge on [0,2R] for every q>2 in the metric

of the Lq.

Several further similar results are given which sig. generalise well known results due to Marcinkiewicz [Ref. 3], and Orlics [Ref. 8].

ASSOCIATION: Moscow State University im. M.V. Lomonosov (Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova)

PRESENTED BY:A, N. Kolmogorov, Academician, April 10, 1957

SUBMITTED: February 28, 1957 AVAILABLE: Library of Congress

Card 2/2

KACHMAZH, S. [Kaczmarz, Stefan]; SHTRINGAUZ, G.; GUTER, R.S. [translator];
ULIVANOV, P.L. [translator]; VILENKIN, N.Ya., rod.

[Theory of orthogonal series] Teoriia ortogonal'nykh risdov.
Pod red. i s dop. N.IA.Vilenkina. Moskva, Gos.izd-vo fizikoPod red. i s dop. N.IA.Vilenkina. Moskva, (MIRA 12:11)
matem.lit-ry, 1958. 507 p.

(Series, Orthogonal)

NIKOT. SKIY, S.M., etv.red.; ABRAMOV, A.A., red.; BOLTYANSKIY, V.G., red.;

VASIL YEV, A.M., red.; MEDVEDEV, B.V., red.; MYSHKIS, A.D., red.;

POSTNIKOV, A.G., red.; PROKHOROV, Yu.V., red.; RYBNIKOV, K.A.,

red.; UL YANOV, P.L., red.; USPKNSKIY, V.A., red.; CHETAYEV, H.G.,

red.; SHIROV, G.Te., red.; SHIRSHOV, A.I., red.; GUSEVA, I.N.,

tekhn.red.

[Proceedings of the Third All-Union Mathematical Congress] Trudy tret'ego Vsesoiuznege matematicheskogo s'exda. Vel.3 [Symoptic papers] Obzornye doklady. Moskva, Izd-vo Akad.nsuk SSSR. 1958. 596 p. (HIRA 12:2)

1. Vsesoyuznyy matematicheskiy s yezd. 3d. Hoscow, 1956. (Mathematics--Congresses)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001857920015-3"

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	P.L. U. YANGU	Northy T.A., University Lecturer, and SOV/55-56-2-33/55 seconds or Tectures 1937 at the Mechanical-Esthematical Meninal Property T.D., Ectanizity Lectures 1937 at the Mechanical-Esthematical Menina 1937 god me makeniko-metematicaleskom fakulitete 100)  The standard of the mechaniko-metematicaleskom fakulitete 100)  The standard State University [Consonovekire 100)  The standard Consonovekire 100 of the standard metematical Standard the 40-th emiversary 100 of the standard o	To a full spike the state of the state of Partial Tollion Spike and the state of th	(72)	
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,16(1) 16,4100 SOY/155-58-4-11/34 Ul'yanov, P.L. AUTHOR: On the Divergence of Orthogonal Series to + m (O raskhodi-TITLE: mosti ortogonal'nykh ryadov k + co) Nauchnyye doklady vysshey shkoly. Fiziko-matematicheskiye PERIODICAL: nauki, 1958, Nr 4, pp 63 - 68 (USSR) ABSTRACT: Let  $a_n > 0$  and  $\sum_{n=1}^{\infty} a_n^2 = \infty$ . Then there exists a system  $\left\{ \psi_{n}(x) \right\}$  of bounded functions orthogonally normed on [0,1] so that the orthogonal series  $\sum_{k=1}^{\infty} b_k \varphi_k(x)$  for every order of the terms diverges everywhere on [0,1] to +  $\infty$ , if  $b_k \geqslant a_k$ . Theorem : Theorem: It exists an orthogram's series  $\sum_{n=1}^{\infty} c_n \phi_n(x)$ , which for an arbitrary sequence of the terms diverges everywhere on [0,1]Card 1/2

On the Divergence of Orthogonal Series to + oo SOV/155-58-4-11/34

with the properties: 1.) it diverges to  $+\infty$  everywhere on  $[a,b]\subset (0,1)$  for arbitrary reversal of the terms 2.) the orthogonally normed system  $\{\psi_n(x)\}$  is bounded on [0,1]. The author mentions D.Ye. Men'shov.

There are 3 references, 2 of which are Soviet, and 1 French.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova (Moscow State University imeni M.V. Lomonosov)

SUBMITTED: . June 4, 1958

Card 2/2

SOV/38-22-4-4/6 Ul'yanov, P.L. AUTHOR:

On the Series With Respect to a Transposed Trigonometric TITLE:

System (O ryadakh po perestavlennoy trigonometricheskoy

sisteme)

Izvestiya Akademii nauk SSSR, Seriya matematicheskaya, 1958, PERIODICAL:

Vol 22,Nr 4,pp 515-542 (USSR)

§ 1. Theorem: Let  $f(x) \in L^2(0,2\pi)$  and for an  $\varepsilon > 0$  let be ABSTRACT:

 $\sum_{n=0}^{\infty} \frac{(\ln \ln n)^{1+\epsilon} \ln n}{n} \left\{ E_n^{(2)}(f) \right\}^2 < \infty, \text{ where } E_n^{(2)}(f) \text{ is the best}$ 

approximation of f(x) in the metric  $L_2$  by trigonometric poly-

nomials of order  $\leq n-1$  . Then the Fourier series of f(x)converges absolutely almost everywhere on [0,27](i.e. under

arbitrary transposition of the terms). Theorem: If

 $f(x) \in L^{2}(0,2i)$  and if for an  $\ell > 0$  it holds :

Card 1/4

On the Series With Respect to a Transposed Trigonometric SOV/38-22-4-4/6 System

$$\int\limits_0^{2\tilde{t}}\int\limits_0^{2\tilde{t}}\frac{|\ln\ t||\ln\ln\ t||^{1+\mathcal{E}}}{t}\left[f(x+t)-f(x-t)\right]^2dt\ dx<\infty\ ,\ then\ the$$

Fourier series of f(x) is absolutely convergent almost everywhere on  $[0,2\pi]$ . § 2 deals with the summability of the series

$$\frac{a}{2} + \sum_{y=1}^{\infty} (a_y \cos k_y x + b_y \sin k_y x)$$
, where all  $k_y$  are integer

and different. It is shown, that even the Fourier series with respect to a transposed system also with relatively strong Töplitz methods need no longer be summable.

§ 3 Theorem: There exists a fixed transposed trigonometric system  $\left\{\cos m_{y}x\right\}$ ,  $\sin m_{y}x$  with the properties 1.) For all  $1 \le p < 2$  there exists an f(x)  $L^{p}(0,2\widetilde{y})$  with derivatives of arbitrary order continuous on  $(0,2\widetilde{\eta})$  and with f(x)=0 for  $x \in [1,2\widetilde{y}-1]$ ; the Fourier series

$$f(x) \sim \frac{a_0}{2} + \sum_{\nu=1}^{\infty} a_{m_{\nu}} \cos m_{\nu} x + b_{m_{\nu}} \sin m_{\nu} x$$

Card 2/ 4

On the Series With Respect to a Transposed Trigonometric SOV/38-22-4-4/6 System

of which diverges almost everywhere on  $[0,2\tilde{i}]$  and does not converge in the metric L; also the Fourier series for the conju-

gate function  $\overline{f}(x) = -\frac{1}{\pi} \lim_{\epsilon \to 0} \left( \frac{f(x+t) - f(x-t)}{2tg \frac{1}{2} t} \right) dt$  diverges

indefinitely on  $[0,2\tilde{\imath}]$  and does not converge in the me. ic L 2.) There exists a continuous function  $\varphi(x)$ , the Fourier series of which with respect to the system  $\{\cos m_0 x, \sin m_0 x\}$  does not converge on  $[0,2\tilde{\imath}]$  in the metric L<sup>p</sup> for any p>2. Constructive proof. § 4 brings several conclusions; e.g. it is proved that the transposed system forms in general for p  $\in$  [1,2) + (2,00) no base in L<sup>p</sup>(0,2 $\tilde{\imath}$ ). Also the Riemannian localization principle does not hold in general for the transposed system. Similar statements are given in the complex domain. Altogether there are given 27 definitions, theorems, conclusions and remarks.

Card 3/4

## "APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001857920015-3

On the Series With Respect to a Transposed Trigonometric SOV/38-22-4-4/6 System

There are 12 references, 6 of which are Soviet, and 6 Polish.

PRESENTED: by Aleksandrov, P.S., Academician

SUBMITTED: October 11, 1957

1. Mathematics 2. Trigonometry 3. Fourier's series

Card 4/4

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APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001857920015-3"

16(1) AUTHOR:

Ul'yanov, P.L.

SOV/38-22-6-4/6

TITLE:

On Unconditional Convergence and Summability (O bezuslovnoy skhodimosti i summiruyemosti)

PERIODICAL:

Izvestiya Akademii nauk SSSR, Seriya matematicheskaya, 1958, Vol 22, Nr 6, pp 811 - 840 (USSR)

ABSTRACT:

The author investigates the connection between the unconditional convergence and summability for trigonometric and orthogonal series. § 1 contains several auxiliary theorems, § 2 considers trigonometric series. Among others it is shown that "unconditional summability" is equivalent to an "unconditional convergence almost everywhere". Furthermore it is shown that the transposed Fourier series of the functions

 $f(x) \in L^p(0,2\pi)$  for p>2 are in general almost everywhere summable with no Toeplitz method. In § 3 it is investigated under which conditions the results of § 2 can be transferred to orthogonal series. Moreover it is tried to explain why in certain cases the results for orthogonal series deviate from those trigonometric series. 11 theorems and more than 20 lemmata, consequences, etc are brought.

Card 1/2

## "APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001857920015-3

On Unconditional Convergence and Summability

SOV/38-22-6-4/6

There are 11 references, 5 of which are Soviet, 5 Polish, and

1 German.

PRESENTED:

by S.L. Sobolev, Academician

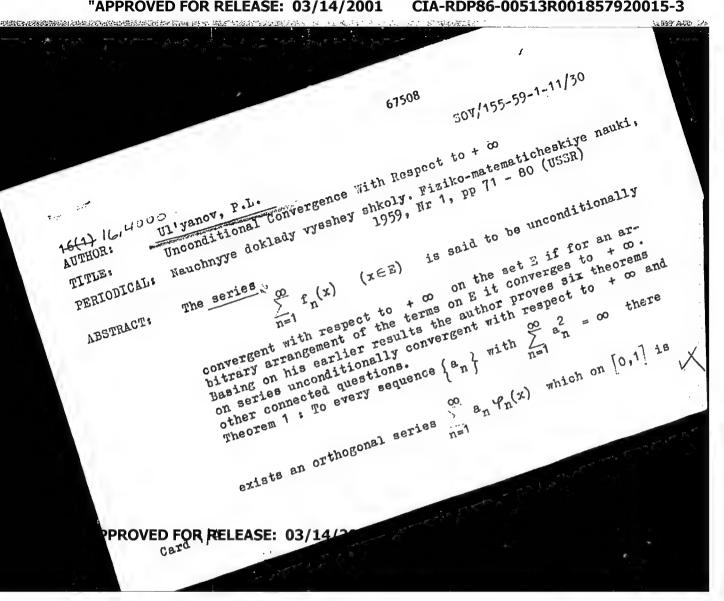
SUBMITTED;

September 29, 1957

Card 2/2

UL'YANOV, P. L., Doc Phys-Math Sci (diss) -- "A Cauchy-type integral. Convergence and summability". Moscow, 1959. 8 pp (Moscow Order of Lenin and Order of Labor Red Banner State U im M. V. Lomonosov), 150 copies (KL, No 9, 1960, 121)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001857920015-3"



67508

SOV/155-59-1-11/30 Unconditional Convergence With Respect to + co unconditionally convergent with respect to + 00. Theorem 2 : To every sequence  $\{a_n\}$  with

 $\sum_{n=4}^{\infty} a_n^2 = \infty$ (2)

there exists an orthogonal series

 $\sum_{n=1}^{\infty} a_n \varphi_n(x)$ (3)

which everywhere on [0,1] is summable with a certain Toepplitzmethod T, while no subsequence  $S_{k_i}(x) = \frac{k_i}{n-1} a_{n+n}(x)$  con-

verges in any point  $x \in [0,1]$ . Then there exists a number S > 0 so that system on [0,1]. Then there exists a number S > 0 so that

Card 2/4

CIA-RDP86-00513R001857920015-3" APPROVED FOR RELEASE: 03/14/2001

Unconditional Convergence With Respect to + o

sov/155-59-1-11/30

if the series

(22) 
$$\sum_{n=1}^{\infty} a_n r_n(x) , \quad |r_n(x)| = A$$

has partial sums for an arbitrary arrangement of the terms

$$\sum_{i=1}^{\infty} a_{k_i} \varphi_{ki}(x)$$
 satisfying the inequation

(23) 
$$\lim_{N\to\infty} \sum_{i=1}^{N} a_{k_i} \varphi_{ki}(x) > -\infty \quad \text{for } x \in E ,$$

where  $m \ge 1 - 5$ , then

(24) 
$$\sum_{n=1}^{\infty} |a_n| < \infty$$

i.e. the series (22) converges absolutely on [0,1] . From

Card 3/4

15

sov/155-59-1-11/30 Unconditional Convergence With Respect to + co this theorem there results as a special case a theorem of Privalov  $\left\{\begin{array}{c} \operatorname{Ref} 4 \end{array}\right\}$  is a bounded orthogonally normed system Theorem 4: If  $\left\{\begin{array}{c} \Upsilon_n(x) \end{array}\right\}$  is a bounded orthogonally normed

on [0,1], then there exists no series  $\sum_{n=1}^{\infty} a_n \psi_n(x)$  which on a set E [0,1] with m E = 1 is unconditionally convergent with respect to  $+\infty$ . Theorem 6': There exists no trigonometric series

 $\sum_{n=1}^{\infty} (a_n \cos 2\pi nx + b_n \sin 2\pi nx) \text{ which on E with m E>0 is}$ 

unconditionally convergent with respect to  $+\infty$ .

The author mentions Z.N. Kazhdan.

There are 5 references, 3 of which are Soviet, 1 Polish and

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonosova

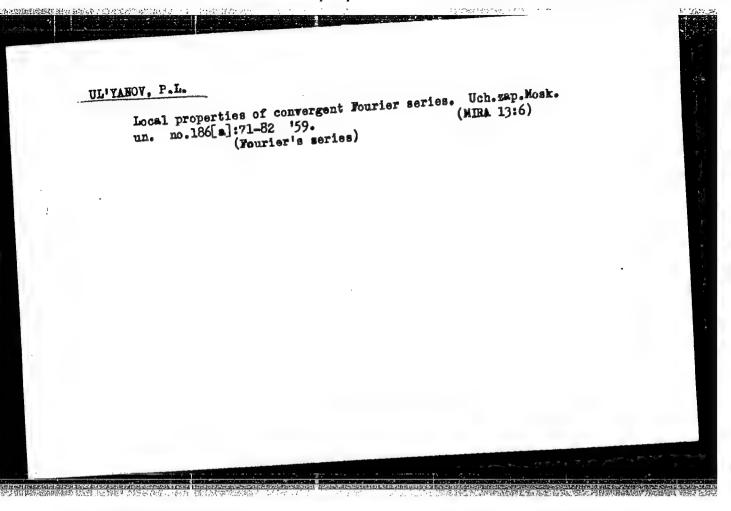
(Moscow State University imeni M.V. Lomonosov)

January 19, 1959 SUBMITTED:

Card 4/4

APPROVED FOR RELEASE: 03/14/2001

CIA-RDP86-00513R001857920015-3"



16.4200

5/055/59/000/05/004/020

AUTHOR: Ul'yanov, P. L.

Singular Integrals and Fourier Series

Vestnik Moskovskogo universiteta. Seriya matematiki, PERIODICAL: mekhaniki, astronomii, fiziki, khimii, 1959, No. 5, wol./4 pp. 33-42

TEXT: The author constructs a continuous function f(x) for which the limit

 $\frac{f(x+t)+f(x-t)-2f(x)}{dt}$ (5)

exists for no x. The Fourier series of this function, however, is uniformly convergent. Moreover it is shown that the functions f(x) with these properties form a set of first category in the set of the continuous 2x -periodical functions. Furthermore it is proved: Theorem 2: There exist two conjugate continuous periodical functions  $F_1(x)$  and  $F_2(x)$  with the properties:

for all x; i = 1,2Card 1/2

Singular Integrals and Fourier Series \$\frac{5055}{59}\frac{5000}{000}\frac{5004}{02}\$  2.) \( \begin{array}{ll} \lim_{b \to 0} \lim_{b \to 0	

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AUTHOR: U1

Ul'yanov, P.L.

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TITLE:

Unconditional Summability

PERIODICAL:

Izvestiya Akademii nauk SSSR, Seriya matematicheskaya, 1959.

Vol 23, Nr 5, pp 781 - 808 (USSR)

ABSTRACT:

The paper contains proofs and some generalizations of the questions already treated by the author in [Ref 4,5,6] concerning the unconditional summability of function and numerical series, whereby the notion of summability is somewhat extended. Altogether the author gives eight theorems, eleven conclusions and ten lemmata. He mentions I.I. Volkov

and A.M. Olevskiy.

There are 12 references, 6 of which are Soviet, 3 Polish.

2 English, and 1 American.

PRESENTED:

by A. N. Kolmogorov, Academician

SUBMITTED:

December 7, 1958

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AUTHOR:

Ul'yanov, P. L.

TITLE:

Convergence and summability

PERIODICAL:

Referativnyy zhurnal, Matematika, no. 2, 1962, 12-13, abstract 2B59. ("Tr. Mosk. matem. o-va," 1960, 9,

373-399)

TEXT: This paper is a continuation of the author's examination of unconditionally summable (in one sense or another) function series (Rzh. Mat., 1960, 7396). By  $B = \| B_{nm} \|$  linear regular summation methods with the aid of factors are denoted.  $B^{\frac{1}{4}} = \| B_{nm} \|$  denotes methods which satisfy the conditions

 $\lim_{n \to \infty} B_{nm} = 1 \quad (m = 0, 1, 2, ...),$ 

(1) .

 $\lim_{m \to \infty} B_{nm} = \sqrt[n]{n}, \quad \lim_{n \to \infty} \sqrt[n]{n} = 0$ 

B\*\* denotes methods having matrices which satisfy (1). By  $T^* = \|a_{nm}\| \sqrt{1}$ 

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linear Toeplitz methods are denoted for which

$$\lim_{n \to \infty} a_{nm} = 0 \quad (m = 0, 1, ...), \quad \lim_{n \to \infty} \sum_{n = 1} a_{nm} = 1.$$

Function series

$$\sum_{n=0}^{\infty} f_n(x) \quad (x \in E)$$
 (2)

are considered, where the  $f_n(x)$  may not be measurable. The series

$$\sum_{k=0}^{\infty} f_{n_k}(x)$$

is called a partial series of the first kind of (2), and the series

$$\sum_{n=0}^{\infty} \int_{\mathbf{n}} \mathbf{f}_{\mathbf{n}}(\mathbf{x}), \quad \hat{\mathbf{f}}_{\mathbf{n}} = 0, \text{ or } 1$$

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is a partial series of the second kind of (2). The series

$$\sum f_{\vec{v}_k}(x)$$

resulting by rearranging the terms of (2) is called a weak rearrangement of (2) if the sequence  $\{\forall_k\}$  splits into finitely many increasing sequences. If for every weak rearrangement of (2) the B-means  $\mathcal{G}_N(x)$  of the resulting series ( $\mathcal{G}_N(x)$  is understood in the sense of

convergence with respect to the outer measure) converge for  $N\to\infty$  on E (almost everywhere on E) with respect to the outer measure, then (2) is weakly, unconditionally B-summable with respect to the outer measure on E (almost everywhere on E). The weak unconditional  $B^+-$ ,  $B^{*+}-$ , and  $T^+-$  summability with respect to the outer measure on E, or almost everywhere on E, are defined in analogy.

Theorem 1: If the series

$$\sum_{n=0}^{\infty} \gamma_n(x) \quad (x \in E)$$

is weakly, unconditionally  $B^{\frac{2}{3}}$  - summable ( $T^{\pm}$  - summable) on E with Card 3/6

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respect to the outer measure, then

$$\Psi_n(x) = f(x) + \tau_n(x), x \in E$$

where f(x) is a finite function on E, and the series

$$\sum_{n=0}^{\infty} \ \gamma_n(x)$$

converges unconditionally on E according to the outer measure. If the method B\* (method T\*) does not sum-up the series

$$\sum_{n=0}^{\infty} 1$$

(3)

then

$$f(x) = 0, x \in E$$
.

Theorem 5: If the series

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Convergence and summability

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$$\sum_{n=0}^{\infty} \psi_n(x) \quad (x \in [0,1])$$

is such that each of its partial series of the first kind on [0,1] is  $B^{\frac{1}{2}}$  - summable with respect to the outer measure, then

$$\psi_n(x) = f(x) + \gamma_n(x)$$

where f(x) is a finite function, and the series  $\sum_{n=0}^{\infty} \gamma_n(x)$ on [0,1] unconditionally with respect to the outer measure. Here f(x) = 0 if (3) is not  $B^{+*}$  - summable.

Theorem 7: If the series

$$\sum_{i=0}^{\infty} f_i(x), \quad x \in E$$
 (4)

is such that each of its partial series of the second kind is  $B^{**}$  \_ summable on E with respect to the outer measure, then (4) is uncondicard 5/6

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Convergence and summability

tionally convergent on E with respect to the outer measure.

A few conclusions are drawn from the stated theorems. The unconditional summability almost everywhere and the case of numerical series are considered. Applications of the obtained results are given regarding orthogonal series and series of the type

$$\sum_{n=0}^{\infty} a_n + (\lambda_n x + \beta_n)$$

where  $\varphi(x)$  is a periodic function, the integral of which is 0. Abstracter's note: Complete translation.

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AUTHOR: Ul'yanov, P.L.

TITLE: Convergence and summability

SOURCE: Moskovskoye matematicheskoye obshchestvo Trudy, v. 9, 1960, 373 - 399

TEXT: The results of this article were reported to the Moscow Mathematical Association on November 24, 1959. The author defines  $B=//B_{n,m}//$  as the methods satisfying

 $\lim_{n \to \infty} B_{n,m} = 1 \qquad (m = 0, 1, \dots) \tag{1}$ 

and  $\lim_{n \to \infty} B_{n,m} = \gamma_n, \quad \lim_{n \to \infty} \gamma_n = 0. \tag{2}$ 

If only (1) is satisfied, the method is denoted by  $B^{**}$ ,  $T^* = a_{n,m}$  denotes the linear methods of Teplits

Card 1/14  $\lim_{n \to \infty} a_{n,m} = 0 \quad (m = 0, 1, ...)$  (3)

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$$\lim_{n \to \infty} \sum_{m=0}^{\infty} a_{n,m} = 1.$$
 (4)

The author then states and proves the following theorems: Theorem 1: If the series

$$\sum_{n=0}^{\infty} \psi_n(x) \qquad (\clubsuit \in E) \tag{19}$$

is weakly absolutely B\*\* - summable (T\* summable) on E according to the lower measure that

$$\psi_{n}(x) = f(x) + \eta_{n}(x) \qquad (x \in \mathbb{A})$$
 (20)

where f(x) is a finite function on E and

$$\sum_{n=0}^{\infty} \eta_n(x) \tag{21}$$

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is absolutely convergent on E according to the lower measure. Also, if the method B\*\* (T\*) does not sum the series

$$\sum_{n=0}^{\infty} 1 \tag{20}$$

then  $f(x) \equiv 0$  for  $x \in \square$  Theorem 2: If series (19) consists of metric functions and is weakly absolutely B\*\*-summable (T\*-summable) on E according to the measure (20), then series (21) is absolutely convergent on E according to the measure and

$$\sum_{n=0}^{\infty} \gamma_n^2(x) < \infty \tag{29}$$

almost everywhere on E. Also, if  $B^{**}$  (T\*) does not sum the series (22) then  $f(x) \equiv 0$  on E. Theorem 3: If near the terms of the series

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$$\sum_{n=0}^{\infty} \psi_n(x) \qquad (x \in [0, 1])$$
 (30)

there are infinitely many metric functions and the series (30) is weakly absolutely B\*-summable (T\*-summable) almost everywhere on [0, 12, then

 $\psi_{n}(x) = f(x) + \eta_{n}(x), (x \in [0, 1])$  (31)

where f(x) is a metric finite function on [0, 1] and the series

$$\sum_{n=0}^{\infty} \eta_n(x) \tag{32}$$

is weakly absolutely convergent almost everywhere on [0, 1]. If B\* (T\*) does not sum (22) then  $f(x) \equiv 0$ . The result of A.M. Olevskiy (Ref. 15: DAN 125, No. 2, 1959, 269-272) is mentioned in the discussion on this theorem. Theorem 4: There exists a regular me-

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thod  $B = //B_{n,m}//$  and an orthogonal series

$$\sum_{n=0}^{\infty} a_n \varphi_n(x) \quad (a_n \varphi_n(x) \rightarrow 0 \text{ on } [0, 1])$$
 (33)

which diverges everywhere on [0, 1] and which neverthele is absolutely B-summable almost everywhere on [0, 1]. The orthogonal series of Men'shov is used in the proper (Ref. 14: Kachmazh S., and G. Shteyngauz, Teoriya ortogonal nykh ryadov (Theory of Orthogonal Series) M., Fizmatgiz, 1958). Theorem 3: If the series

$$\sum_{n=0}^{\infty} \psi_n(x) \qquad (x \in [0, 1]) \tag{48}$$

is such that any of its partial series of the first kind are B\*\*-summable on  $[0,\ 1]$  according to the lower measure

$$\psi_n(x) = f(x) + \gamma_n(x)$$

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Convergence and summability

where f(x) is a finite function and the series

$$\sum_{n=0}^{\infty} \eta_n(x)$$

is absolutely convergent on [0, 1] according to the lower measure. f(x) = 0 if (22) is not B\*\*-summable. Theorem 6: There exists an orthogonal series

$$\sum_{n=0}^{\infty} c_n \varphi_n(x) \quad (c_n \varphi_n(x) \rightarrow 0 \text{ on } [0, 1]), \tag{56}$$

and which nevertheless is such that any one of its partial series of the first kind is (C, 1)-summable almost everywhere on [0, 1] [Abstractor's note: (C, 1) summability not defined]. Theorem 7% If the series

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Convergence and summability

$$\sum_{i=0}^{\infty} f_i(x) \qquad (x \in E) \tag{70}$$

is such that any of its partial series of the second kind is B\*\*summable on E according to the lower measure, then (70) is absolutely convergent on E to the lower measure. Theorem 8: If series
(70) consists of metric functions on [0, 1] and any of its partial series of the second kind is B\*\*-summable on [0, 1], then this
series is absolutely convergent on [0, 1] according to the measure, and

$$\sum_{i=0}^{\infty} f_i^2(x) < \infty \text{ for almost all } x \in [0, 1].$$
 (72)

Theorem 9: If the series

$$\sum_{i=0}^{\infty} f_i(x) \qquad (x \in E) \tag{75}$$

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